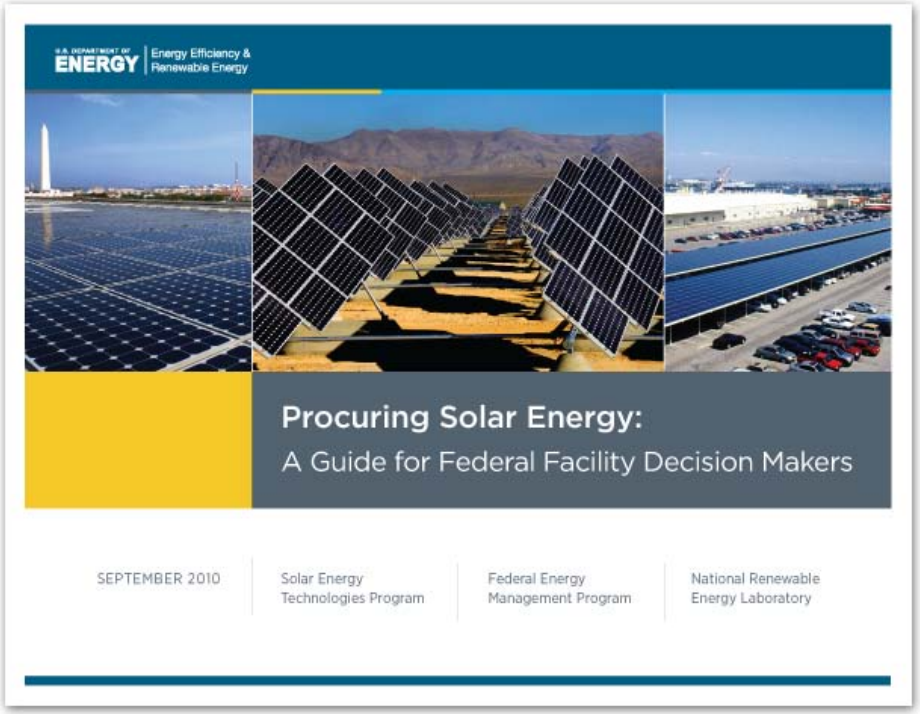


Practical Guidance:

Procuring Solar Energy for Federal Facilities

NREL NATIONAL RENEWABLE ENERGY LABORATORY

FEMP Federal Energy Management Program

Eric Partyka
Sentech/SRA, International

Blaise Stoltenberg
National Renewable Energy Laboratory

Solar Energy Technologies Program, Market Transformation: Technical Assistance to the GSA

U.S. DEPARTMENT OF ENERGY | Energy Efficiency & Renewable Energy

To work in tandem with the Federal Energy Management Program (FEMP) to provide technical assistance to government entities with the goal of *overcoming market barriers* inhibiting the installation of solar systems at their facilities.

GSA's ARRA Photovoltaic Projects

Providing technical assistance on over 40 ongoing projects:

- Technology selection
- RFP development
- Proposal review
- User training
- System monitoring
- Project financing
- Preparation of bid specifications
- Building codes review
- Structural analysis

Other project assistance completed:

Architects of the Capitol

Kennedy Center

Alcatraz

San Juan, Puerto Rico

Smithsonian Zoo

GSA ARRA: PV Projects

U.S. DEPARTMENT OF ENERGY | Energy Efficiency & Renewable Energy

Solar Program, FEMP, and NREL provided technical assistance on:

- Boston, MA, O'Neill Jr. Fed Bldg
- Charlotte Amalies, St. Thomas, VI, Ron de Lugo Fed Bldg
- Philadelphia, PA, Veterans Admin Center
- Raleigh, NC, Terry Sanford Fed Bldg
- Carbondale, IL, Sen. Paul Simon Fed Bldg
- Houma, LA, Ellender Fed Bldg Post Office
- Gallup, NM, Gallup Fed Bldg
- Victoria, TX, MLK Jr Fed Bldg
- Austin, TX, V.A. Automation Center
- Laguna Niguel, CA, Chet Holifield Fed Bldg
- Washington, DC, Veterans Admin Bldg
- Washington, DC, GSA Regional Office Bldg
- Washington, DC, U.S. Tax Court
- Washington, DC, Theodore Roosevelt Bldg
- Reston, VA, Advanced Systems Center
- Seattle, WA, 1201 Fed Center South
- Kansas City, KS, Dole Courthouse
- Madison, WI, Kastenmeier Fed Courthouse
- Washington, DC, Howard T. Markey National Courts Bldg
- Washington, DC, E. Barret Prettyman U.S. Courthouse
- Richmond, VA, Robinson/Merhige U.S. Courthouse
- Washington, DC, Robert Weaver (HUD) Bldg
- Omaha, NE, Edward Zorinsky Fed Bldg
- Denver CO, Denver Fed Center

Alcatraz: PV/Hybrid Off-Grid

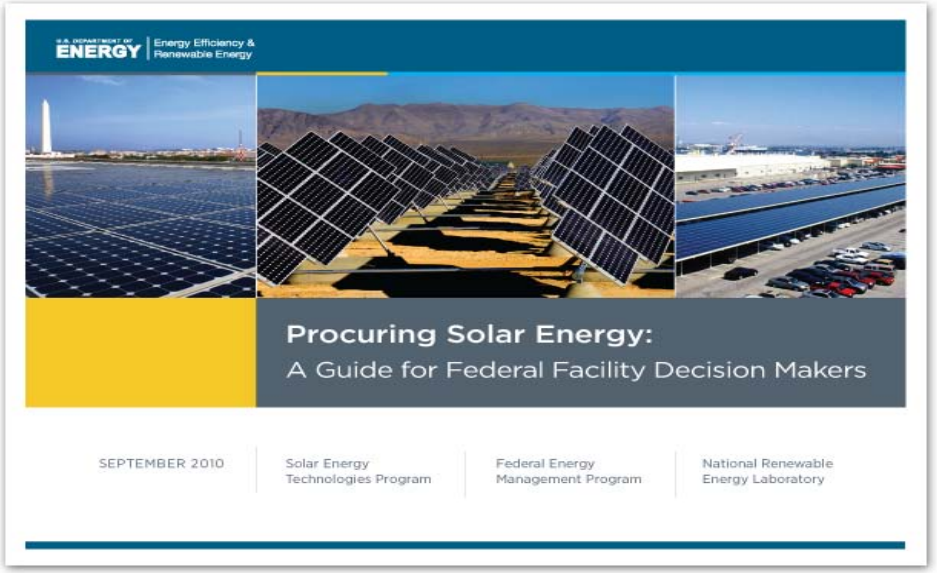
- Site of first lighthouse and U.S. fort on the West Coast, infamous prison, birthplace of American Indian Red Power movement, and now popular tourist attraction
- Solar contractor selected
- 300+ kW PV / 480V battery bank / 2 diesel generator design nearing completion
- Construction due to begin fall 2010
- Hardware installation will be funded by ARRA
- Technical assistance to NPS to overcome barriers, assist in RFP process, and design reviews provided by NREL with funding from both FEMP and DOE Solar Program

David Corby

The Federal Guide to Solar: What is it?

Audience & Purpose

- Designed for federal facilities managers, procurement officers, and project managers.
- Introduces the value of solar projects for various agency targets, goals, and requirements.
- Explains preliminary solar site screenings and feasibility studies.
- Guides readers through the major steps for solar projects planning and execution.

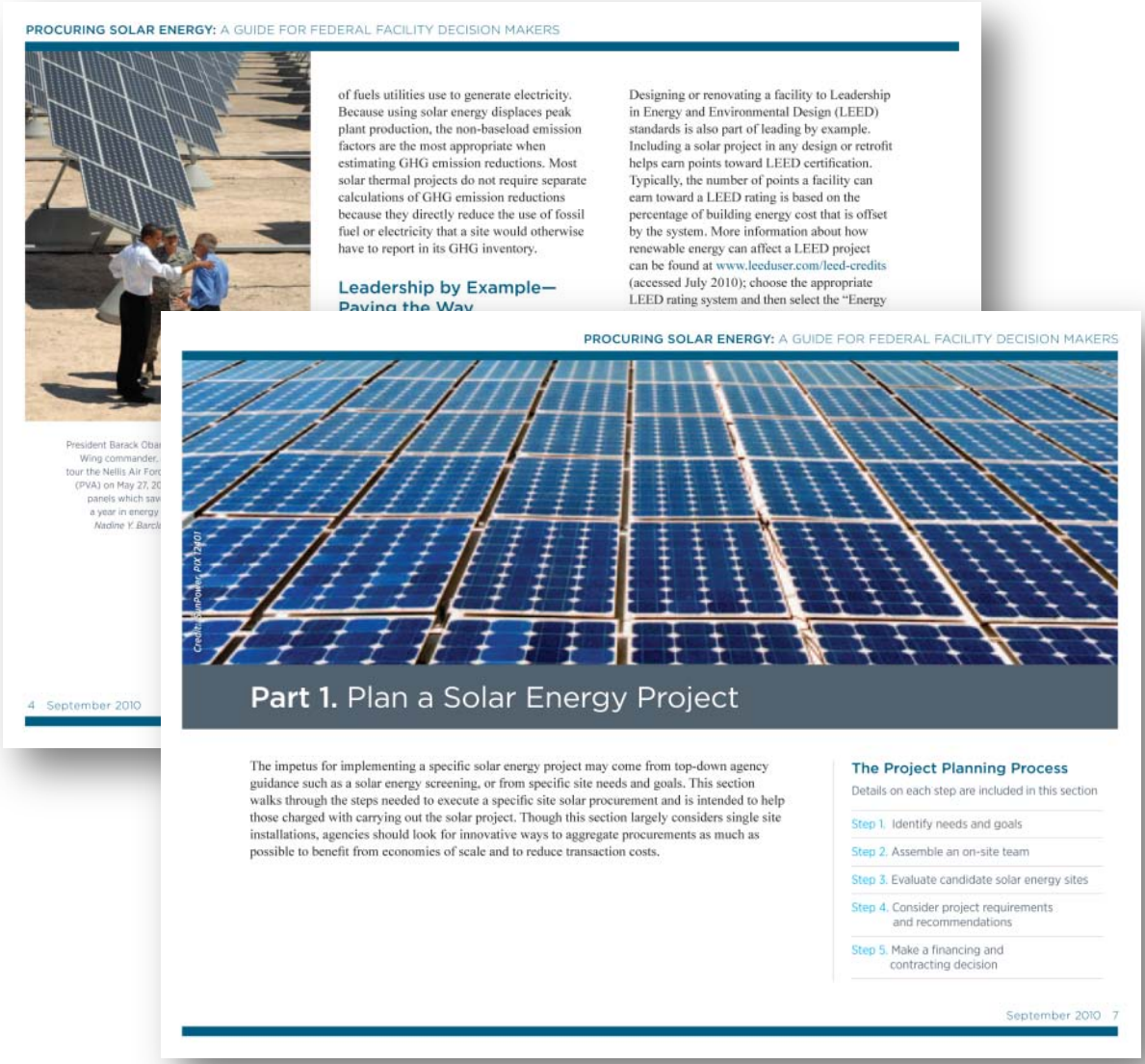


Veterans Administration Jerry L. Pettis Memorial Medical Center in Loma Linda, CA

What is the Procuring Solar Energy Guide?

A basic overview of the solar project process at federal sites in a concise, easy to understand, and step-by-step format.

Detailed information and sample documents for specific tasks are referenced with Web links or included in the manual's appendix.



Overall Solar Project Process

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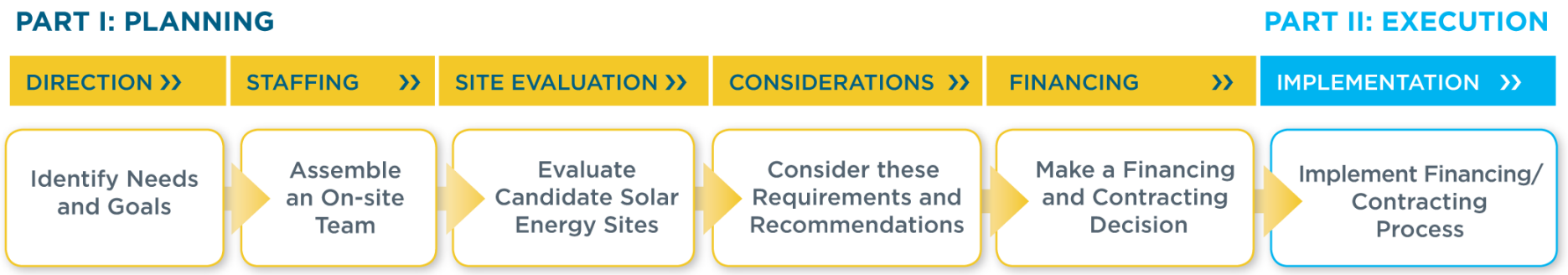

1 Identify Needs & Goals

2 Assemble On-site Team

3 Evaluate Solar Screening

4 General Project Considerations

5 Select Financing/Contracting Option

6 Execute Selected Financing/Contracting Process

- Agency funded project
- Power purchase agreement (PPA)
- Energy savings performance contract (ESPC)
- Utility energy service contract (UESC)
- Enhanced use lease (EUL)

Background

Federal Requirements

- Energy Policy Act of 2005
- Executive Order (E.O.) 13423, Strengthening Federal Environmental, Energy, and Transportation Management
- Energy Independence and Security Act of 2007
- Executive Order 13514, Federal Leadership in Environmental, Energy, and Economic Performance

Assume an Agency Wide Solar Screening

- Responsibility for renewable energy targets at agency level
- Able to select most promising sites to develop

1. Identify Needs & Goals

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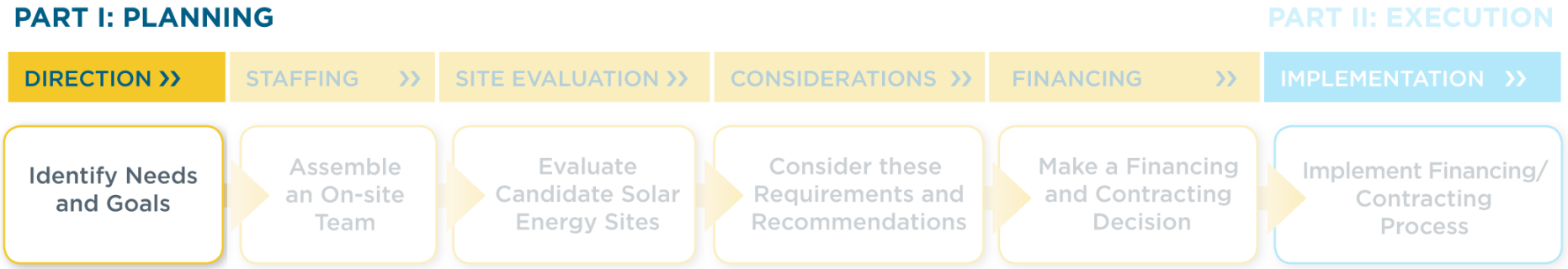


Why are you considering/doing a solar project?

- Renewable energy targets
- Have appropriations for your facility
- Smart option for addressing your site's needs
- Credits toward LEED certification

What are the potential goals?

- Maximize on-site solar energy production
- Maximize return on investment
- Meet a minimum annual solar energy production target
- Maximize GHG reduction

2. The Team

People to consider for on-site project team

- Energy manager
- Facilities manager
- Contracting officer
- Attorney
- Budget officer
- Real estate officer
- Environmental officer
- Sustainability officer
- Safety officer

Success Factors

- Project champion
- Contracting officer and attorney with strong leadership characteristics
- Team alignment, dedication and creativity

3. Solar Assessment

PART I: PLANNING | **PART II: EXECUTION**

DIRECTION ›› | STAFFING ›› | **SITE EVALUATION ››** | CONSIDERATIONS ›› | FINANCING ›› | IMPLEMENTATION ››

Identify Needs and Goals → Assemble an On-site Team → **Evaluate Candidate Solar Energy Sites** → Consider these Requirements and Recommendations → Make a Financing and Contracting Decision → Implement Financing/ Contracting Process

Solar shading analysis tool

Solar Screening Provides

- Estimated system size
- Estimated production (kWh/yr or Btu/yr)
- Estimated cost
- Preliminary economic analysis
- Preliminary evaluation of roofing and structural integrity

Feasibility Study Provides

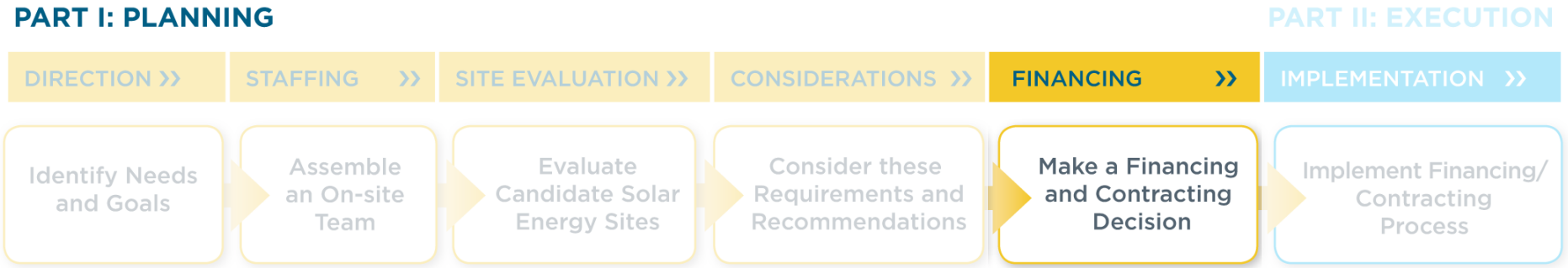
- More precise and detailed solar screening analysis
- Utility interconnection analysis
- Recommended technologies and applications based on specific site conditions

4. General Project Considerations

Considerations

- Utility interaction
- National Environmental Policy Act
- Site master plan review
- Requirements for meeting renewable energy goals
- Project incentives
- Historic building issues
- Computer network connectivity authority
- Buy American Act

5. Financing/Contracting Options



Agency Funded Project

The outright purchase of a solar energy system.

Power Purchase Agreement (PPA)

A private entity installs, owns, operates, and maintains customer-sited solar energy project.
The site purchases energy through a long-term contract with specified energy prices.

Energy Savings Performance Contract (ESPC)

A private entity finances and implements energy conservation measures.
Debt is paid from operational savings, which are guaranteed.

Utility Energy Service Contract (UESC)

A serving utility finances and implements energy conservation measures.
Debt is paid primarily from operational savings.

Enhanced Use Lease (EUL)

A real estate agreement using under-utilized land.
The lease is competed and payment can be cash and/or in-kind consideration.

Part II. Execute a Solar Project

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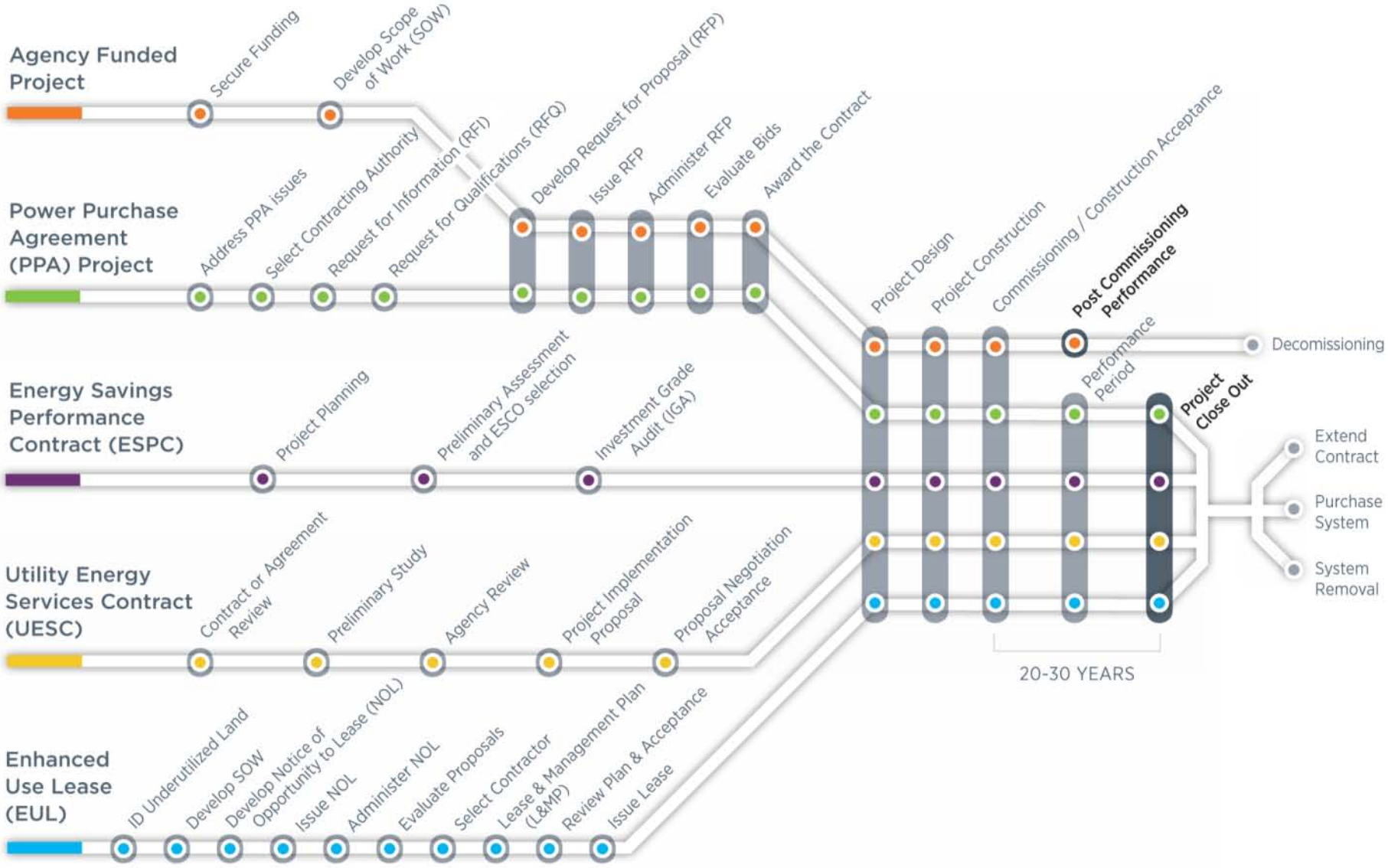

Example Finance/Contract Mechanism

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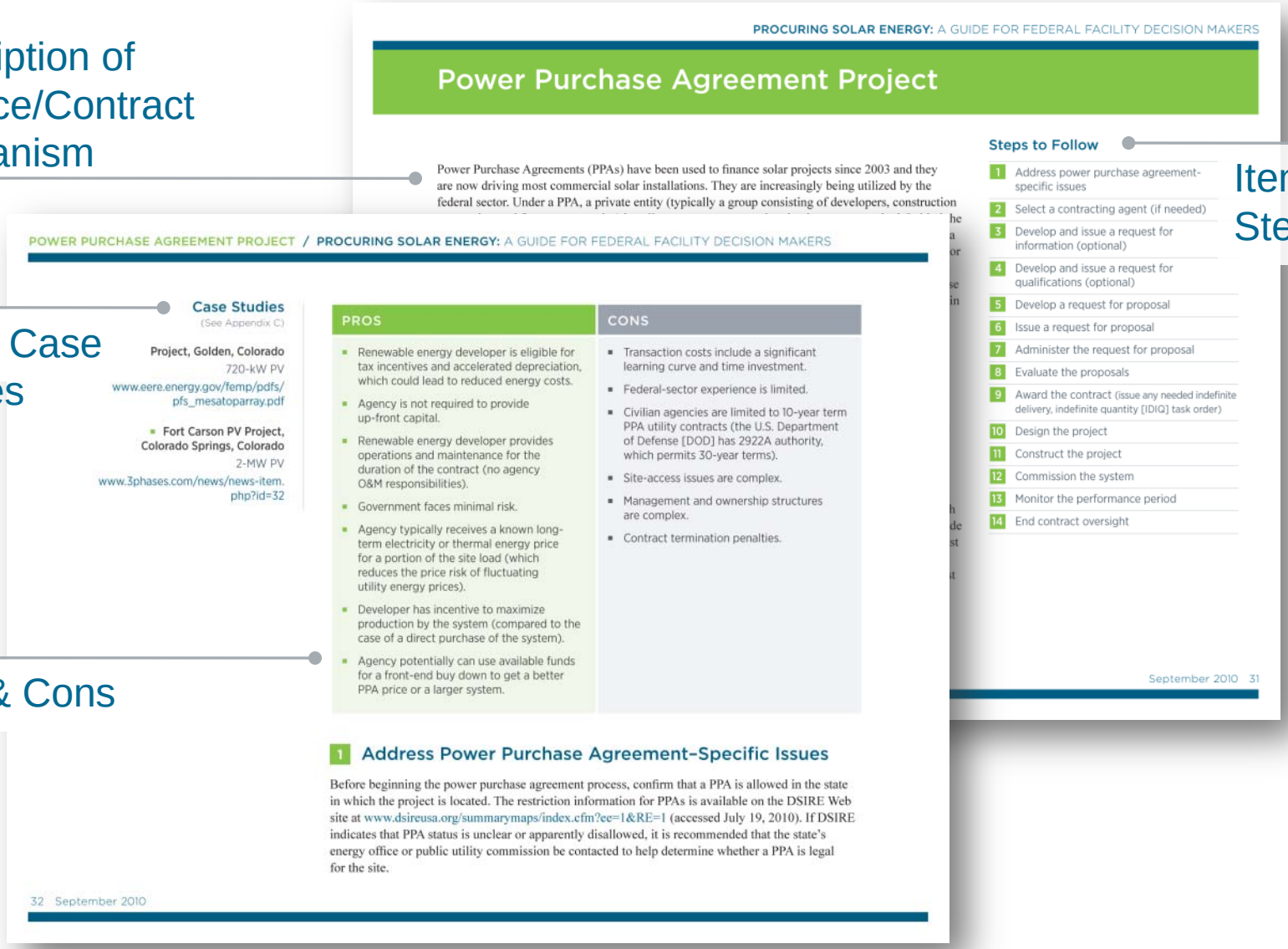
Description of Finance/Contract Mechanism

List of Case Studies

Pros & Cons

Itemized Steps



PROCURING SOLAR ENERGY: A GUIDE FOR FEDERAL FACILITY DECISION MAKERS

Power Purchase Agreement Project

Power Purchase Agreements (PPAs) have been used to finance solar projects since 2003 and they are now driving most commercial solar installations. They are increasingly being utilized by the federal sector. Under a PPA, a private entity (typically a group consisting of developers, construction

Steps to Follow

1. Address power purchase agreement-specific issues
2. Select a contracting agent (if needed)
3. Develop and issue a request for information (optional)
4. Develop and issue a request for qualifications (optional)
5. Develop a request for proposal
6. Issue a request for proposal
7. Administer the request for proposal
8. Evaluate the proposals
9. Award the contract (issue any needed indefinite delivery, indefinite quantity [IDIQ] task order)
10. Design the project
11. Construct the project
12. Commission the system
13. Monitor the performance period
14. End contract oversight

September 2010 31

POWER PURCHASE AGREEMENT PROJECT / PROCURING SOLAR ENERGY: A GUIDE FOR FEDERAL FACILITY DECISION MAKERS

Case Studies

(See Appendix C)

Project, Golden, Colorado
720-kW PV
www.eere.energy.gov/femp/pdfs/pfs_mesatoparray.pdf

- **Fort Carson PV Project, Colorado Springs, Colorado**
2-MW PV
www.3phases.com/news/news-item.php?id=32

PROS	CONS
▪ Renewable energy developer is eligible for tax incentives and accelerated depreciation, which could lead to reduced energy costs.	▪ Transaction costs include a significant learning curve and time investment.
▪ Agency is not required to provide up-front capital.	▪ Federal-sector experience is limited.
▪ Renewable energy developer provides operations and maintenance for the duration of the contract (no agency O&M responsibilities).	▪ Civilian agencies are limited to 10-year term PPA utility contracts (the U.S. Department of Defense [DOD] has 2922A authority, which permits 30-year terms).
▪ Government faces minimal risk.	▪ Site-access issues are complex.
▪ Agency typically receives a known long-term electricity or thermal energy price for a portion of the site load (which reduces the price risk of fluctuating utility energy prices).	▪ Management and ownership structures are complex.
▪ Developer has incentive to maximize production by the system (compared to the case of a direct purchase of the system).	▪ Contract termination penalties.
▪ Agency potentially can use available funds for a front-end buy down to get a better PPA price or a larger system.	

1 Address Power Purchase Agreement-Specific Issues

Before beginning the power purchase agreement process, confirm that a PPA is allowed in the state in which the project is located. The restriction information for PPAs is available on the DSIRE Web site at www.dsireusa.org/summarymaps/index.cfm?ec=1&RE=1 (accessed July 19, 2010). If DSIRE indicates that PPA status is unclear or apparently disallowed, it is recommended that the state's energy office or public utility commission be contacted to help determine whether a PPA is legal for the site.

32 September 2010

Appendix


Photo Credit: Bob Madani for DOE/FEMP


Photo Credit: Northern Power Systems

Solar Technology Overview

Checklists

- Self-guided solar screening
- Solar screening evaluation checklist
- PV project design evaluation checklist
- PV commissioning checklist

Case Studies for each Financing Mechanism

- Agency funded
- PPA
- ESPC
- UESC
- EUL

Available Training & Contacts

U.S. DEPARTMENT OF ENERGY | Energy Efficiency & Renewable Energy

FEMP Webinars, Workshops, and Trainings

- www.femp.energy.gov/training/

Sample Trainings

- Introduction to Federal Renewable Energy Goals and FEMP Services
- Project Planning: Determining the Best Renewable Energy Project for Your Site
- Introduction to UESCs Webinar
- ESPC Comprehensive Workshop

FEMP Case Studies:

- www.femp.energy.gov/technologies/renewable_casestudies.html

EERE Information Center:

- 877-EERE-INF or 877-337-3463

Assistance Moving Forward

Current Technical & Developmental Capabilities

- Technology selection
- RFP development
- Proposal review
- System monitoring
- Project economic analysis
- Preparation of bid-specifications

What Services Would be Helpful in the Future?

- Workshops/trainings?
  - (Topics?)
- Partnering?
- Program development?
  - e.g., work with agency to develop overall solar procurement program

Do You Have a Project?

Thank You

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Contact:

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